LECTURE ON LESSONS OF THE WAR.

BY

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TO THE

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THE LESSONS OF THE WAR TO THE MEDICAL PROFESSION.

I PROPOSE, in the remarks which I have the honor to present to the Massachusetts Medical Society, to review, as briefly as possible, some of the points in which real additions have been made to the knowledge of our profession by the experience of the recent war. In so doing I will speak not only of surgery, but will ask your attention to the means employed for preserving the health of the army, and particularly to the construction of hospitals. With your permission I will also refer, somewhat informally, to other matters which, during four years service in the army, have come under my observation, and which seem worthy of remembrance. The surgical and medical history of the war, based upon statistical data of the broadest and most complete character, is now in active preparation at the office of the Surgeon General in Washington, and will, at no very distant day, be given to the world. Meanwhile, under the modest title of Circular No. 6, we have already received an account of the enormous mass of material which it will include, and have learned some of the interesting results which are distinctly foreshadowed. To these I shall refer as the highest authority we have upon certain important questions. There is also another class of subjects which cannot be reduced to statistical form, and for these I must ask you to allow me to give impressions and belief founded upon personal observation.

I suppose the general feeling among those who, at the beginning of the war, found themselves suddenly transformed from civil practitioners into army surgeons, was something like this: We will study Army Regulations and learn the rules of the service as fast as possible; establish friendly relations with officers and men, and preserve their lives and health by hygienic rules and counsel; avoid all unnecessary operations, and by all means practise what we have learned about conservative surgery to the utmost extent.

These anticipations were not all fulfilled. Fortunate was the man who quietly submitted to the inexorable Regulations, who tried no new and original plans for the execution of his duties, and who did not vex his spirit and impair his usefulness by scolding at red tape.

Friendly and pleasant relations with officers and men are completely in the power of the surgeon, and this for several reasons.

First. Because no man knows but that his life may be at the Doctor's disposal at any moment, whether he wills it or not.

Second. Because, by the wise and admirable provisions of the service, the medical officer has full and complete authority, which not even the Commander-in-Chief may gainsay, to excuse from duty, by reason of sickness, any one he thinks proper.

Concerning the preservation of health by hygienic precautions, our most sanguine hopes were fulfilled. The authority to mend abuses was not, as in the case of sickness, absolute with the surgeon, and could only be exercised through commanding officers; yet, with a little care and discretion, it could almost always be freely exerted.

Of the practice of conservative surgery for gunshot injuries, I can say in general terms that it led to disappointment. So far is it from being true that we amputated unnecessarily, I believe the error, at least in the early period of the war,

was in the other direction. Immediate amputation in very many cases of broken limbs, which a vain attempt was made to save, would have resulted in the preservation of life. I say immediate and not primary amputation, and this is one of those points which statistics do not make clear, since the division is universally drawn between primary and secondary operations; the period during which the former may be practised including two or three days. The difference between the chances of recovery of a man whose leg or arm is amputated within an hour or two of his injury, and one whose case is deferred twenty-four or forty-eight hours, even although irritative fever has not been set up, I believe to be very great. Why this is so, is not completely evident, but of the fact I am well convinced. Perhaps the mental condition may explain it, at least in part. A man who has been hit in battle is in a state of *mind* to bear immediate operation, if the surgeon so decrees. He is elated, proud of his wound, surprised that he was not killed outright, and ready for anything. The shock to the nervous system which we observe in railroad accidents, and unexpected and inglorious injuries, seems to be counteracted by this state of mind, and has never, within my observation, been a bar to immediate action on the part of the surgeon at the field hospital. Indeed, if the opportunity is then lost, it may in certain cases never return. The next day, after a sleepless night, the mental and bodily conditions are less favorable. If the man passes the Division Hospital without operation, he arrives in due time at the General Hospital, remote from the field. Here the surgeons are less busy, and if the case is one of broken thigh, or leg, or arm, it is, perhaps, amputated, or the attempt to make the splintered ends unite is continued. In either case the chance of recovery is far less than if immediate amputation had been practised.

The results of conservative surgery, applied to fractures of the femur, are thus given in Circular No. 6:—Whole

number treated without amputation, 1761: recovered, 321; died, 796; undetermined, 644. It will be observed that the number of undetermined cases at the date of report (Nov., 1865) is very large. The records of civil hospitals since the close of the war show that many of the cases which had seemed to terminate favorably have not in reality done so, but have required frequent removal of dead bone. This is not readily done; in fact, it is a difficult and perilous procedure to remove portions of the shaft of the femur, and when successfully accomplished is often discovered to be not final and conclusive. The same trouble recurs, and after repeated operations the patient has not infrequently died after months and years of suffering. Cases of complete and permanent recovery are certainly rare, and from the return of the men to civil life their number cannot be definitely fixed by the army reports. My own belief is, that in gunshot fracture of the femur, in either the lower or middle third, immediate amputation should be the rule. In fractures of the upper third it would depend upon the amount of comminution and the condition of the great vessels, but even here, in a majority of cases, immediate amputation would, I think, give the best chance for the preservation of life. The same rule of immediate amputation is equally applicable to gunshot injuries of the knee and ankle, and almost equally so to fractures of the bones of the leg.

In gunshot fractures involving the shoulder joint, great and positive additions to surgery have been made in the late war. More than 800 cases have been treated by excision, and with a less mortality than when amputation at the joint was practised. Up to November, 1865, 575 cases of excision of the shoulder joint were reported: 252 primary, and 323 secondary. The mortality of the first was 23 per cent., of the second 38 per cent. Since that date more than 200 additional cases have been reported. In the Crimea the French army had 38, and the English 16 cases. Our surgeons have

demonstrated the advantages of this operation both in the preservation of life and limb. That the arm is useful, we have abundant evidence in the ability to write, and, indeed, to use the hand with power and effect, which is now often witnessed, and in the numerous photographs of the Army Medical Museum. That subsequent operations for the removal of dead bone are not unknown is certainly true, but the same occurs after amputations, and the operation in the case of the arm is usually neither difficult nor dangerous.

Of other excisions it may be generally stated that their results have been less successful than those of the shoulder joint. Of the wrist, very few were practised. Of the elbow, 315 cases are reported, with a somewhat greater mortality than from amputations of the arm. Excisions of the knee joint were seldom made, and the results were unfavorable. In 32 instances excision of the head of the femur was practised, and in 4 cases recovery followed. When we remember that previous to our war only 12 instances of this operation for gunshot wound were on record, and with but a single recovery, the report of our surgeons may be regarded as highly satisfactory. Of excisions in the continuity of the long bones of the extremities, no favorable report can be made. The mortality was greater than from amputations, and this experience corresponds with that of recent European wars. Amputation at the hip joint was done 21 times, and in three instances recovery followed.

Anæsthetics were universally used in our army; chloroform alone in the field, as ether was too bulky and inflammable for transportation. I have never known or heard of an instance in which our surgeons had not a supply at hand sufficient for all their needs.

Of the ambulance system I would say that, after many trials and frequent failures, it was brought in the last two years of the war to a condition very near perfection. Nothing could be more admirable than the manner in which the

wounded were taken from where they fell to the field hospitals, and thence, together with the sick, to the base hospitals, in the Army of the Potomac in 1864. Officers and men engaged in this special duty were of the bravest and best; picked men, proud of their department, and fully understanding its peril to be equal to that of serving in the ranks. No provisions which could then be suggested for the comfort and safety of the wounded and sick were omitted. Such provisions, however, were necessarily limited by the strength and solidity of the ambulances required to pass over the horrible roads.

In the recent European war a very simple arrangement was used by the Prussian army, which seems to have been never thought of in ours. Its usefulness is apparent on the mere statement, and had it been suggested to the Surgeon General I do not doubt it would have been at once adopted. This is a system by which wounded men are ticketed by the first surgeon into whose hands they may happen to come. A card, stating the nature of the injury and signed by the surgeon, is attached to the man's clothing. This plan would have saved much time and suffering, as otherwise every wounded man was liable to be examined unnecessarily.

The ability of both wounded and sick to bear transportation was a constant subject of surprise to our medical officers. Here again I cannot doubt that the mental condition of the sufferers, who knew they were going to a place of safety, combined with an abundant supply of fresh air, were the influences which enabled them to bear with impunity such hard usage as would, under other circumstances, have been fatal. The inestimable value of an unlimited supply of fresh air to our wounded and sick was, indeed, a subject of daily observation. It often happened, for instance, that a farm house and outbuildings were used for several days as a temporary hospital. In these cases the occupants of the piazza and horse sheds, and similar places, with only a shelter

from the sky, did better than those who were provided for within the house.

Let me ask your attention to another lesson of the war which seems to me well worthy of remembrance. We have, unhappily, evidence enough in our homes of the loss of life among those who served in the army. But there is another view of the subject equally striking and instructive, in which our profession may feel a just pride. I refer to the number of those who have been saved from death by disease through a hygienic system which the spirit of the age, the enlightened and generous provision of the Government, and the watchful and constant care of the Medical Department, have conspired to create and keep alive. The idea of war generally entertained in times of peace has been of a succession of combats, and of men killed and wounded. No very distinct perception seems to have been had before our great struggle, or perhaps, I should say, until the close of the Crimean war, of the possibility of warding off epidemics, and of anticipating and averting the attacks of disease which all experience has shown to be far more destructive to armies than the fire of the enemy. Of the wars of the first Napoleon we know on this point only that the losses by disease were enormous. It was not the policy of rulers in those days to tell the world how many men they sacrificed, nor was sanitary science at all understood. In our Mexican war between 10 and 11 per cent. of the force engaged died annually from disease. The Allies in the Crimea lost at least 25 per cent. annually by disease. In our recent war the loss by disease in the first year was 49 in a thousand. In the second year, 65 in a thousand. In the third and fourth year the ratio is reported by the Surgeon General's office as not greater than in the first and second. The records are not yet completely analyzed, but enough is known to warrant this statement. We have, then, an annual loss of about six per cent. by disease, and this while campaigning in a country full of malarious

influences, and where fever is as rife among the inhabitants as anywhere within the boundaries of the United States. It will be seen at once that had our deaths from disease been in the ratio which previous experience had given as the rule of war, their number in four years would have been appalling. It can be no exaggeration to say that the number of lives preserved—lives which, according to the usual mortality of war, would have been sacrificed—was greater than the whole number of lives lost both by disease and battle.

Looking at these facts as medical men, we find them not accidental, but the direct and logical consequence of the rules of hygienic science as applied to war. The military necessity which compelled our armies to be in constant movement, and which kept them for the most part in the open country and away from large towns, had much to do with their exemption from epidemics, as well as from syphilis and other diseases which follow the excesses to which soldiers are prone; but these influences alone could never produce such results. What has been done, and is now doing successfully in the great cities of Europe to diminish disease and prolong life, has been even more successfully practised, and for the first time in military history, for armies in the field. Good and sufficient clothing, clean and well drained camps, abundant food and plenty of coffee, unlimited exposure to sun and air, and hospitals perfectly ventilated, have produced their legitimate results. To the attainment of these great ends, all departments of the Government have contributed, but the Medical Department first and chiefly. The neatness of our camps might indeed give a useful hint to Massachusetts farmers whose sinks, house drains, privies and adjacent premises would often be the better for such "policing" as a Medical Inspector would require for a soldier's quarters, and no one can doubt that the family health would be correspondingly improved. Other things being equal, it was found in our army that the regiments

best disciplined, whose officers and men were most proud of their neatness and order, whose camps were cleanest, and whose cooking utensils were brightest, were most free from disease.

In the early period of the war, the only hospitals known in our army beyond the tents provided for regiments grew out of the necessities of the case. No large provision was made for the shelter of the sick and wounded. Consequently all sorts of expedients were improvised by medical officers under the authority of local commanders. In this way houses, barns, churches and warehouses came to be used as hospitals. Where lumber was attainable, rude and temporary buildings were put together in such form as the surgeons desired. Hence a great number of models were furnished for comparison, and from these rude beginnings grew, not from any single mind, but by the conjoined labor and experience of the Medical Department, a plan of hospital construction more extensive and far more perfect than had before been known, and which, when its usefulness was proved, was adopted by the War Department and required to be exclusively used by medical officers. The value of this experience in hospital construction seems to be inestimable in civil as well as military service, and I desire to bring to your notice the distinctive features of a plan which combines in the simplest form all that is necessary, and, I am almost inclined to say, as much as is useful, for the proper care of the sick when brought together in large numbers for medical and surgical treatment. The foundation stone of this plan is the supply, under all circumstances, in summer and winter, in all kinds of weather, and by the simplest possible means, of an abundant supply of fresh air. The second great principle involved is the separation of different parts of the hospital, so that infection may not be carried from one ward to another. All other details are unimportant and not essential to the working of the plan. The first of these objects

is attained, in a way which I will presently describe, by making the buildings used as wards one story high; and no deviation from this rule is possible. The wards are detached and separate structures, and each at a distance of at least thirty feet from any other. The length of these wards may vary with the extent and shape of the ground to be occupied, but I shall give that which was ordered for the United States General Hospitals. The other dimensions are fixed and invariable. Length, 187 feet; width, 24 feet; height, 15 feet from floor to eaves, and 19 feet from floor to ridge. The floor elevated 18 inches from the ground, with free ventilation beneath it. A door at either end, and, if convenient, one on either side also. Sixteen windows on each side. A ward of this length contains sixty beds, with an allowance of more than a thousand cubic feet of air space for each patient. Ventilation is provided in summer and winter in the following manner:—The ridge of the building is open in its whole length, but provided with an outer cap or cover projecting over the edges of the opening and raised a few inches above it. This false ridge is provided with shutters, by which a partial or complete closure can be made. Air is introduced in summer through gratings in the floor, and by the windows and doors, and finds free exit above in the whole length of the building. In winter the shutters in the ridge are closed. Air is then introduced through the gratings before mentioned, directly over which are placed stoves, which may be of any pattern for burning either wood or coal. Eight feet distant from each stove is a vertical wooden shaft 18 inches square passing through the roof, where it is properly capped, and coming down to the level of the tie-beams, where it receives the smoke pipe, which passes through its whole length. A powerful upward current of air is thus produced. This mode of ventilation has been tested in all the varieties of climate which our country affords, from Maine to Louisiana, and has been found perfectly efficient. The only modifica-

tion required by the extreme cold of New England is the closure of the space beneath the wards, and the introduction of air by horizontal shafts, as we supply our furnaces.

The wards are connected with each other, and with the buildings used for cooking, washing, storage, and general administration, by covered walks having floors but no sides. A portion of either end of each ward may be partitioned off for rooms for nurses, and for water-closets.

Never before have military hospitals been so free from diseases generated within themselves as those just described. They are now disused and demolished, but the lessons which they teach, let us hope, will not be forgotten.